Leica Viva

Leica Zeno 10/Zeno 15

User Manual

Version 3.0
English

- when it has to be **right**

Leica Geosystems

Introduction

Purchase

Congratulations on the purchase of a Leica Zeno 10/Zeno 15.

This manual contains important safety directions as well as instructions for setting up the product and operating it. Refer to "5 Safety Directions" for further information.
Read carefully through the User Manual before you switch on the product.

Product identification

The type and serial number of your product are indicated on the type plate.
Enter the type and serial number in your manual and always refer to this information when you need to contact your agency or Leica Geosystems authorised service workshop.

Type: _____

Serial No.: _____

Symbols

The symbols used in this manual have the following meanings:

Type	Description
Danger	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
Warning	Indicates a potentially hazardous situation or an unintended use which, if not avoided, could result in death or serious injury.
Caution	Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor or moderate injury and/or appreciable material, financial and environmental damage.
	Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

Trademarks

- Windows is a registered trademark of Microsoft Corporation in the United States and other countries
- CompactFlash and CF are trademarks of SanDisk Corporation
- Bluetooth is a registered trademark of Bluetooth SIG, Inc.
- SD is a trademark of the SD Card Association

All other trademarks are the property of their respective owners.

Validity of this manual

This manual applies to the Zeno 10 and Zeno 15 GNSS/GIS handhelds. Differences between the various models are marked and described.

Available documentation

Name	Description/Format		
Zeno 10/Zeno 15 User Manual	All instructions required in order to operate the product to a basic level are contained in the User Manual. Provides an overview of the product together with technical data and safety directions.	✓	✓

Name	Description/Format		
Zeno GIS Getting Started Guide	Describes the general working of the product in standard use. Intended as a quick reference field guide.		✓

Name	Description/Format		
Zeno GIS Help *	Overall comprehensive help to the product and application functions. Included are detailed descriptions of special software/hardware settings and software/hardware functions.		

* only available as Online Help

Refer to the following resources for all Zeno 10/Zeno 15 documentation/software:

- the Leica Zeno GIS DVD
- https://myworld.leica-geosystems.com

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myworld @Leica Geosystems

myWorld@Leica Geosystems (**https://myworld.leica-geosystems.com**) offers a wide range of services, information and training material.
With direct access to myWorld, you are able to access all relevant services whenever it is convenient for you, 24 hours a day, 7 days per week. This increases your efficiency and keeps you and your equipment instantly updated with the latest information from Leica Geosystems.

Service	Description
myProducts	Simply add all Leica Geosystems products that you and your company own. View detailed information on your products, buy additional options or Customer Care Packages (CCPs), update your products with the latest software and keep up-to-date with the latest documentation.
myService	View the service history of your products in Leica Geosystems Service Centers and detailed information on the services performed on your products. For your products that are currently in Leica Geosystems Service Centers view the current service status and the expected end date of service.
mySupport	Create new support requests for your products that will be answered by your local Leica Geosystems Support Team. View the complete history of your Support and view detailed information on each request in case you want to refer to previous support requests.
myTraining	Enhance your product knowledge with the Leica Geosystems Campus - Information, Knowledge, Training. Study the latest online training material or download training material on your products. Keep up-to-date with the latest News on your products and register for Seminars or Courses in your country.

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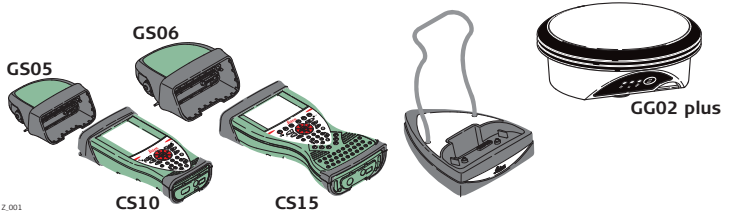
1 Description of the System

1.1 Overview

System components



1.2 Terminology

CS general description

CS is a collective term describing the various models (CS10/CS15) of the multi-purpose field controller.

Zeno general description

Zeno is a collective term describing the various models (Zeno 10/Zeno 15) of the Leica Zeno GNSS/GIS handhelds:

- Leica Zeno 10: GNSS/GIS handheld consisting of CS10 field controller and GS05 GNSS cap.
- Leica Zeno 15: GNSS/GIS handheld consisting of CS15 field controller and GS06 GNSS cap.
- Leica Zeno Rover: GNSS/GIS rover consisting of CS10/CS15 field controller and GG02 plus antenna.

CS available models

Model	Touch screen	Colour display	Internal 3.5 GSM/ UMTS modem	Internal battery*1	SD card	CompactFlash card	Bluetooth	Wireless LAN 802.11b/g	Windows CE
CS10 GIS	✓	✓	-	✓	✓	✓	✓	-	✓
CS10 3.5G GIS	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS15 GIS	✓	✓	-	✓	✓	✓	✓	-	✓
CS15 3.5G GIS	✓	✓	✓	✓	✓	✓	✓	✓	✓
☞ Use the supplied stylus on the screens of the touch screen.									

*1 removable

1.3 System Concept

1.3.1 Software Concept

Software for all CS models

Software type	Description
CS firmware (CS_xx.fw)	This software includes: - The language-specific version of Windows CE. - The basic functionality of the CS.

Software for the GS05/GS06

Software type	Description
GS firmware (GS_xx.fw)	This software includes: - The firmware for the measurement engine.

Software for the GG02 plus

Software type	Description
GG firmware (GG_xx.fw)	This software includes: - The firmware for the measurement engine.

Software upload

Uploading firmware can take some time. Ensure that the battery is at least 75% full before beginning the upload, and do not remove the battery during the upload process.

Software for	Description
All CS models	The software is stored in the flash RAM of the CS field controller. **CS firmware update instructions** • Download the most recent CS firmware file from https://myworld.leica-geosystems.com. Refer to "Introduction". • Connect the CS field controller to your PC. Refer to "3.1.7 Connecting to a Personal Computer". • Copy CS firmware file onto a folder on the Leica SD card, Leica CompactFlash card or USB stick. • Tap the Loader icon from the desktop, to run the Loader application. • Browse to the directory into which you copied CS firmware file, select it and start the upload. • A message will appear when the upload is complete. Ensure that a Leica SD card or a Leica CF card is inserted into the CS field controller before starting the upload.

Software for	Description
GS05/GS06	The software is stored in the flash RAM of the GS05/GS06. **GS firmware update instructions** • Download the most recent GS firmware file from https://myworld.leica-geosystems.com. Refer to "Introduction". • Connect the CS field controller to your PC. Refer to "3.1.7 Connecting to a Personal Computer". • Copy GS firmware file onto a folder on the Leica SD card, Leica CompactFlash card or USB stick. • Click on Start › Programs › Zeno Tools › Firmware, to run the Firmware loader application. • Browse to the directory into which you copied GS firmware file, select it and start the upload.

Software for	Description
GG02 plus	The software is stored in the flash RAM of the GG02 plus. **GG firmware update instructions** • Download the most recent GG firmware file from https://myworld.leica-geosystems.com. Refer to "Introduction". • Copy GG firmware file onto a PC with Leica Zeno Field installed. • Connect the GG02 plus with the GEV234 cable to the PC. Refer to "3.1.7 Connecting to a Personal Computer". • Click on Start › Programs › Zeno Tools › Firmware, to run the Firmware loader application. • Browse to the directory into which you copied GG firmware file, select it and start the upload.

1.3.2 Power Concept

General

Use the Leica Geosystems batteries, chargers and accessories or accessories recommended by Leica Geosystems to ensure the correct functionality of the instrument.

Power options

Model	Power supply
all CS models	Internally by GEB211/GEB212 battery, OR Externally by docking station, OR Externally by GEV235 cable, OR Externally by GEV219 cable (only CS models with LEMO CBC01 connector module), OR Externally by GDC221 car adapter If an external power supply is connected and the internal battery is inserted, then the external power is used.
GS05/GS06	Externally by CS field controller
GG02 plus	Internally by GEB211/GEB212 battery, OR Externally by GEV219 cable If an external power supply is connected and the internal battery is inserted, then the external power is used.

1.3.3 Data Storage Concept

Description

Data is stored on a memory device. The memory device can be an SD card, CompactFlash card, USB stick or internal memory.

Memory device

SD card:	All CS field controllers have an SD card slot fitted as standard. An SD card can be inserted and removed. Available capacity: 1 GB.
CompactFlash card:	All CS field controllers have a CF card slot fitted as standard. A CompactFlash card can be inserted and removed. Available capacity: 256 MB, 1 GB.
USB stick:	All CS field controllers have a USB port fitted as standard.
Internal memory:	All CS field controllers have an internal memory fitted as standard. Available capacity: 1 GB.

While other SD cards or CompactFlash cards can be used, Leica Geosystems recommends to only use Leica SD cards or Leica CompactFlash cards and is not responsible for data loss or any other error that can occur while using a non-Leica card.

Removing the SD card, CompactFlash card or USB stick while the CS field controller is turned on can cause loss of data. Only remove the SD card, CompactFlash card or USB stick or unplug connecting cables when the CS field controller is switched off.

Transfer data

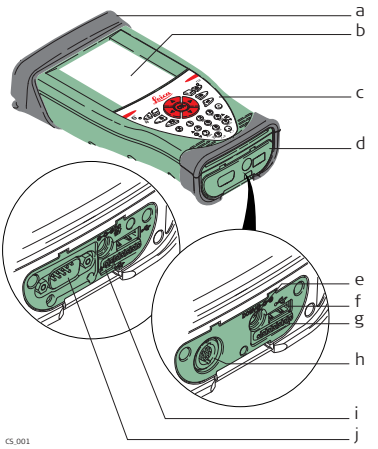
Data can be transferred in various ways.
Refer to "3.1.7 Connecting to a Personal Computer".

CompactFlash cards and SD cards can directly be used in an OMNI drive as supplied by Leica Geosystems. Other PC card drives can require an adaptor.

1.4 CS Components

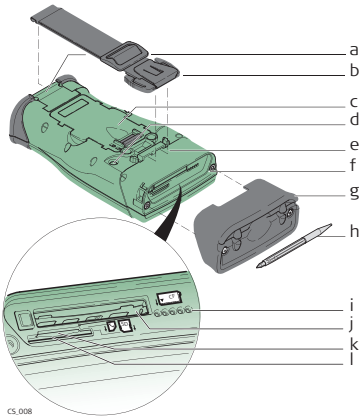
1.4.1 CS10

Upside of CS10



a) Slot Cover
b) Screen
c) Keyboard
d) Port cover
e) Power socket
f) USB A Host port
g) Docking station contacts
h) LEMO port (USB and serial)
i) USB Mini port
j) DSUB9 port

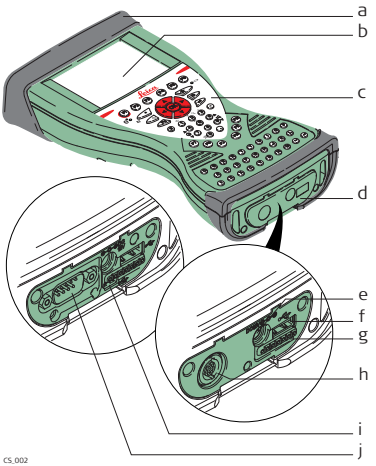
Underside of CS10



a) Hand strap bottom clips
b) Hand strap
c) Battery compartment
d) Digital camera
e) Hand strap top clips
f) Slots
g) Slot cover
h) Stylus
i) GS05 contacts
j) CompactFlash card slot
k) SIM card slot
l) SD card slot

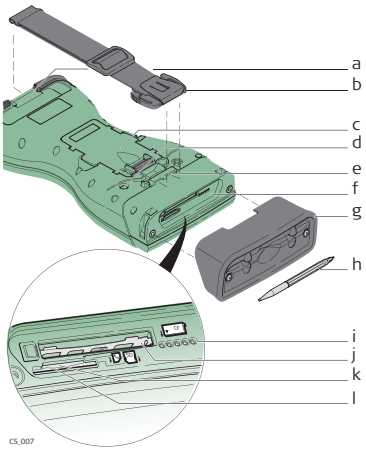
1.4.2 CS15

Upside of CS15



a) Slot cover
b) Screen
c) Keyboard
d) Port cover
e) Power socket
f) USB A Host port
g) Docking station contacts
h) LEMO port (USB and serial)
i) USB Mini port
j) DSUB9 port

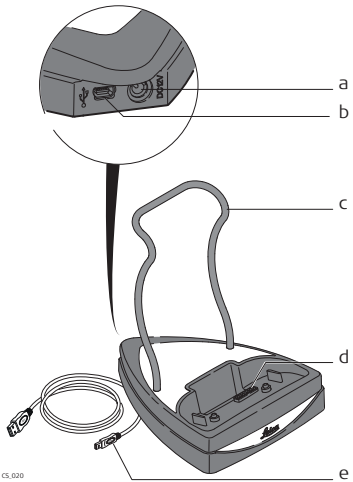
Underside of CS15



a) Hand strap bottom clips
b) Hand strap
c) Battery compartment
d) Digital camera
e) Hand strap top clips
f) Slots
g) Slot cover
h) Stylus
i) GS06 contacts
j) CompactFlash card slot
k) SIM card slot
l) SD card slot

1.5 Docking Station Components

Docking station

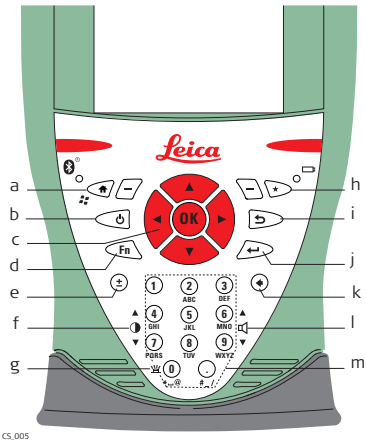


a) Power socket
b) USB port
c) Docking station bracket
d) Docking station contacts
e) GEV223 data cable

2 User Interface

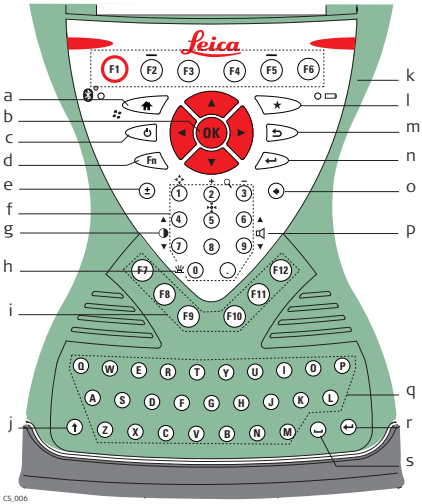
2.1 Keyboard

Keyboard display CS10



a) Home
b) ON/OFF
c) Arrow keys, **OK**
d) **Fn**
e) ± key
f) Brightness
g) Keyboard illumination
h) Favourites
i) ESC
j) Enter
k) Backspace
l) Volume
m) Numeric keys

Keyboard display CS15



a) Home
b) Arrow keys, **OK**
c) ON/OFF
d) **Fn**
e) ± key
f) Numeric keys
g) Brightness
h) Keyboard illumination
i) Function keys **F7** - **F12**
j) CAPS Lock
k) Function keys **F1** - **F6**
l) Favourites
m) ESC
n) ENTER
o) Backspace
p) Volume
q) Alpha keys
r) ENTER
s) SPACE

Keys

Key		Function
Function keys **F1**-**F6**		Correspond to six softkeys that appear on the bottom of the screen when the screen is activated.
Function keys **F7**-**F12**		User definable keys to execute chosen commands or access chosen screens.
Alpha keys		To type letters.
Numeric keys		To type numbers.
Caps Lock		Switches between upper case and lower case letters.
Backspace		Clears all entry at the beginning of user input. Clears the last character during user input.
Esc		Leaves the current screen without storing any changes.
Fn		Switches between the first and second level of function keys.
Space		Enters a blank.

Key	Function
Enter	Selects the highlighted line and leads to the next logical menu/ dialog. Starts the edit mode for editable fields. Opens a selectable list.
ON/OFF	If CS10/CS15 already off: Turns on CS10/CS15 when held for 2 s. If CS10/CS15 in stand-by mode: Turns on CS10/CS15 when held < 2 s. If CS10/CS15 already on: • Puts CS10/CS15 into stand-by mode when held < 2 s. Refer to "Putting CS field controller into stand-by". • Turns to Power Options menu when held for 2 s. Refer to "Power Options menu". • Turns off CS10/CS15 when held for 5 s.
Favourites	Goes to a website by simply clicking its name.
Home	Switches to the Windows CE Start Menu.

Key	Function
Arrow keys	Move the focus on the screen.
OK	Selects the highlighted line and leads to the next logical menu/dialog. Starts the edit mode for editable fields. Opens a selectable list.

Key combinations

Key	Function
+	Hold **Fn** while pressing **4**. Increase the screen brightness.
+	Hold **Fn** while pressing **7**. Decrease the screen brightness.
+	Hold **Fn** while pressing **6**. Increase the volume for acoustic warning signals, beeps and keypresses on the CS field controller.
+	Hold **Fn** while pressing **9**. Decrease the volume for acoustic warning signals, beeps and keypresses on the CS field controller.
+	Hold **Fn** while pressing **0**. If keyboard illumination is already off: Turns on keyboard illumination. If keyboard illumination is already on: Turns off keyboard illumination.

2.2 Operating Principles

Keyboard and touch screen

The user interface is operated either by the keyboard or by the touch screen with supplied stylus. The workflow is the same for keyboard and touch screen entry, the only difference lies in the way information is selected and entered.

Operation by keyboard
Information is selected and entered using the keys. Refer to "2.1 Keyboard" for a detailed description of the keys on the keyboard and their function.

Operation by touch screen
Information is selected and entered on the screen using the supplied stylus.

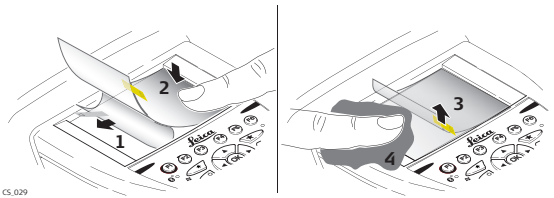
Operation	Description
To select an item	Tap on the item.
To start the edit mode in editable fields	Tap on the editable field.
To highlight an item or parts of it for editing	Drag the supplied stylus from the left to the right.
To accept data entered into an editable field and exit the edit mode	Tap on the screen outside of the editable field.
To open a context-sensitive menu	Tap on the item and hold for 2 s.

3 Operation

3.1 Equipment Setup

3.1.1 Fixing the Display Foil to the CS

Fixing the display foil to the CS step-by-step

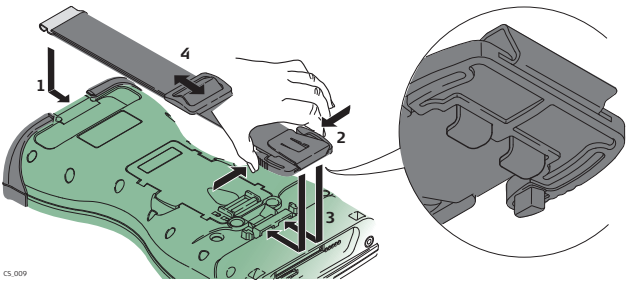


Step	Description
☞	Ensure that the display of the CS is free of dust and grease.
☞	The non-reflecting display foil has a silver-coloured sticker to peel away the carrier foil from the actual display foil.
1.	Touch the silver-coloured sticker with two fingers and pull it slowly upwards. The carrier foil is peeling away. ☞ Do not peel the carrier foil more than 2 cm - 3 cm away.

Step	Description
2.	Fix the laid open adhesive underside of the display foil at the display border. ☞ Pay attention that the display foil is not fixed between display and display frame.
3.	Peel away the carrier foil bit by bit and smooth it out slowly onto the display.
4.	Potential air bubbles between display and display foil have to be smoothed out using the included microfibre cloth. ☞ Do not use sharp objects!

3.1.2 Fixing a Hand Strap to the CS

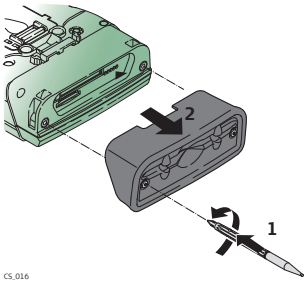
Fixing the CS to a hand strap step-by-step



Step	Description
☞	Turn the CS field controller over.
1.	Take the end of the hand strap and clip it to the base of CS field controller.
2.	Compress the clips of the main hook.
3.	Lower the main hook onto the pivot knob of the CS field controller. A click can be felt when the clip is secure.
4.	Adjust the length of the hand strap.

3.1.3 Fixing the Slot Cover to the CS

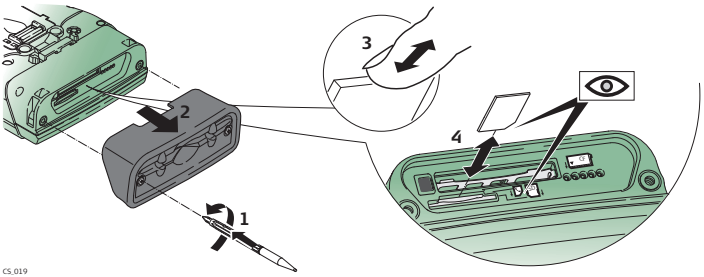
Fixing the slot cover to the CS step-by-step



Step	Description
1.	Press the screwdriver end of the supplied stylus on the quarter-turn screws and loosen them.
2.	Remove the slot cover.
☞	Reattach the slot cover with the stylus, making sure the quarter-turn screws are seated.

3.1.4 Inserting and Removing a SIM Card

Insert and remove a SIM card step-by-step



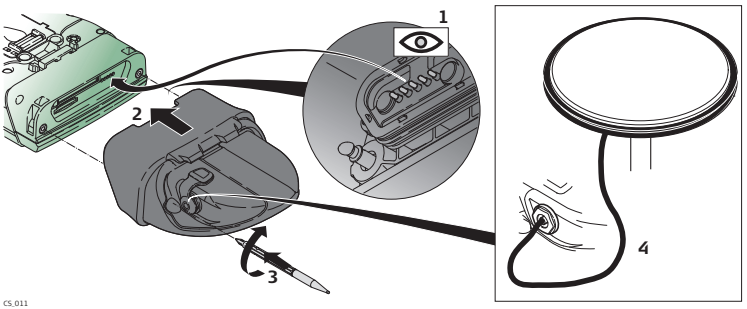
	Description
☞	The SIM card is inserted into a slot inside the top of the CS10/CS15.
1.	Loosen the screws inside the slot cover on top of the CS10/CS15 using the screwdriver end of the stylus.
2.	Detach the slot cover from the CS10/CS15.
3.	Slide the card firmly into the slot until it clicks into position. ☞ Do not force the card into the slot. The card should be held with the contacts facing the slot.

	Description
4.	Attach the slot cover and tighten the screws.
5.	To remove the card, detach the slot cover of the CS10/CS15.
6.	Gently press the top of the card to release it from the slot.
7.	Remove the SIM card and attach the slot cover.

3.1.5 Setting up as Handheld GNSS

The setup GS05/CS10 is identical to the setup GS06/CS15. For simplicity, the setup GS05/CS10 is used in the following.

Attaching the GS05 to the CS10 step-by-step

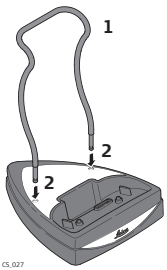


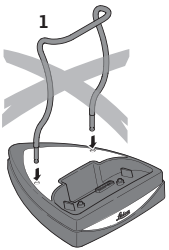
Step	Description
	Detach the slot cover from the CS10. Refer to "3.1.3 Fixing the Slot Cover to the CS".
1.	Check the position of the contacts in the inner surface of the GS05.

Step	Description
2.	Attach the GS05 to the CS10.
3.	Press the screwdriver end of the supplied stylus on the quarter-turn screws and tighten them.
4.	To achieve the optimal satellite tracking performance, mount the AS05 (external GNSS antenna) on the GS05.

3.1.6 Setting up the Docking Station

Mounting components of the docking station step-by-step





Step	Description
1.	Hold the docking station bracket as shown in the illustration in relation to the docking station rack.
2.	Slightly press the holder into the docking station rack. A click can be felt when the holder is secure.

3.1.7 Connecting to a Personal Computer

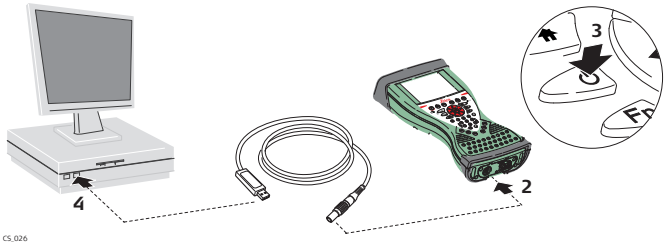
Microsoft ActiveSync (for PCs with Windows XP operating system) or Windows Mobile Device Center (for PCs with Windows Vista or Windows 7 operating system) is the synchronisation software for Windows mobile-based pocket PCs. Microsoft ActiveSync or Windows Mobile Device Center enables a PC and a Windows mobile-based pocket PC to communicate.

Install Leica Viva USB drivers

Step	Description
1.	Start the PC.
2.	Insert the Leica Viva Series DVD.
3.	Run the **SetupViva&GR_USB_XX.exe** to install the drivers necessary for Leica Viva devices. Depending on the version (32bit or 64bit) of the operating system on your PC, you have to select between the three setup files following: • SetupViva&GR_USB_32bit.exe • SetupViva&GR_USB_64bit.exe • SetupViva&GR_USB_64bit_itanium.exe The setup has to be run only once for all Leica Viva devices.

Step	Description
4.	The **Welcome to InstallShield Wizard for Leica Viva & GR USB drivers** window appears. ☞ Ensure that all Leica Viva devices are disconnected from your PC before you continue!
5.	**Next>**.
6.	The **Ready to Install the Program** window appears.
7.	**Install**. The drivers will be installed on your PC. ☞ For PCs with Windows Vista or Windows 7 operating system: If not already installed, Windows Mobile Device Center will be installed additionally.
8.	The **InstallShield Wizard Completed** window appears.
9.	Check **I have read the instructions** and click **Finish** to exit the wizard.

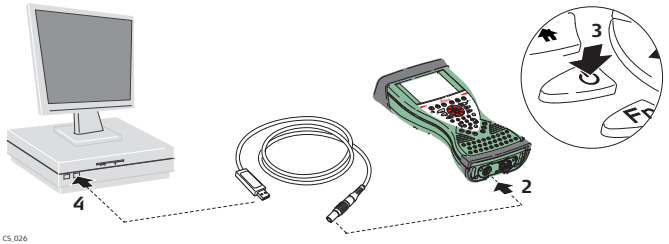
Connect USB cable to PC for the first time step-by-step



Step	Description
1.	Start the PC.
2.	Plug the GEV234 cable into CS field controller. For CS field controllers with DSUB9 connector, the GEV223 cable has to be used.
3.	Turn on the CS field controller.
4.	Plug the GEV234 cable into the USB port of the PC. The **Found New Hardware Wizard** starts up automatically.
5.	Check **Yes, this time only**. **Next>**.

Step	Description
6.	Check **Install the software automatically (Recommended)**. **Next>**. The software for **Remote NDIS based LGS CS Device** will be installed on your PC.
7.	**Finish**.
8.	The **Found New Hardware Wizard** starts up automatically a second time.
9.	Check **Yes, this time only**. **Next>**.
10.	Check **Install the software automatically (Recommended)**. **Next>**. The software for **LGS CS USB Device** will be installed on your PC.
11.	**Finish**.
	For PCs with Windows XP operating system:
12.	Run the ActiveSync installation program if not already installed.
13.	Allow USB connections inside the **Connection Settings** window of Active-Sync.
	For PCs with Windows Vista or Windows 7 operating system:
14.	Windows Mobile Device Center starts up automatically. If does not start automatically, start Windows Mobile Device Center.

Connect to PC via USB cable step-by-step



Step	Description
1.	Start the PC.
2.	Plug the GEV234 cable into CS field controller. For CS field controllers with DSUB9 connector, the GEV223 cable has to be used.
3.	Turn the CS field controller on.
4.	Plug the GEV234 cable into the USB port of the PC.
	For PCs with Windows XP operating system:
	ActiveSync starts up automatically. If does not start automatically, start ActiveSync. If not already installed, run the ActiveSync installation program.

Step	Description
5.	Allow USB connections inside the **Connection Settings** window of Active-Sync.
6.	Click **Explore** in ActiveySync.
	The folders on the CS field controller are displayed under **Mobile Devices**. The folders of the data storage device can be found in **StorageCard**.
	For PCs with Windows Vista or Windows 7 operating system:
	Windows Mobile Device Center starts up automatically. If does not start automatically, start Windows Mobile Device Center.

3.2 Power Functions

Turning CS field controller on

Press and hold power key ( ) for 2 s.

CS field controller must have a power supply.

Turning CS field controller off

Press and hold power key ( ) for 5 s.

CS field controller must be on.

Putting CS field controller into stand-by

Press and hold power key ( ) < 2 s.

CS field controller must be on.

Power Options menu

Press and hold power key ( ) for 2 s to open **Power Options** menu.

CS field controller must be on.

Option	Description
Turn off	Turn CS field controller off.
Stand-by	Put CS field controller into stand-by mode. In stand-by mode, CS field controller shuts down and reduces power consumption. Rebooting from stand-by mode is quicker than a cold start after turning off.

Option	Description
Lock keyboard	Lock the keyboard. Option turns to **Unlock keyboard**.
Turn off touch screen	Disable touch screen. Option turns to **Turn on touch screen**.
Reset...	Perform one of the following options: • **Restart** (restarts Windows CE) • **Reset Windows CE** (resets Windows CE and communication settings to factory defaults) • **Reset installed software** (resets settings of all installed software) • **Reset Windows CE and installed software** (resets Windows CE and settings of all installed software)

3.3 Batteries

3.3.1 Operating Principles

Charging / first-time use

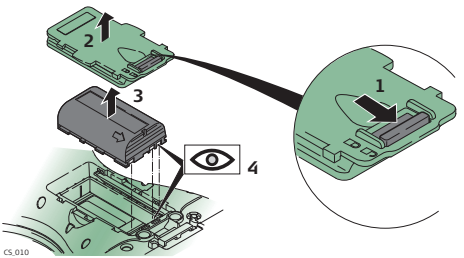
- The battery must be charged prior to using it for the first time because it is delivered with an energy content as low as possible.
- The permissible temperature range for charging is between 0°C to +40°C/+32°F to +104°F. For optimal charging, we recommend charging the batteries at a low ambient temperature of +10°C to +20°C/+50°F to +68°F if possible.
- It is normal for the battery to become warm during charging. Using the chargers recommended by Leica Geosystems, it is not possible to charge the battery if the temperature is too high.
- For new batteries or batteries that have been stored for a long time (> three months), it is effectual to make only one charge/discharge cycle.
- For Li-Ion batteries, a single discharging and charging cycle is sufficient. We recommend carrying out the process when the battery capacity indicated on the charger or on a Leica Geosystems product deviates significantly from the actual battery capacity available.

Operation / Discharging

- The batteries can be operated from -20°C to +55°C/-4°F to +131°F.
- Low operating temperatures reduce the capacity that can be drawn; high operating temperatures reduce the service life of the battery.

3.3.2 Changing the Battery

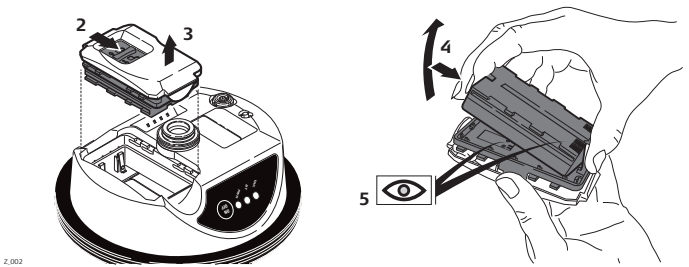
Insert and remove the battery on the CS field controller step-by-step



Step	Description
☞	Turn CS field controller over to gain access to the battery compartment.
1.	Push the slide fastener in the direction of the arrow with the open-lock symbol.
2.	Open the battery compartment.
3.	Pull the battery from the battery compartment.
4.	Place the battery into the battery compartment with the Leica logo facing to the top.

Step	Description
5.	Close the battery compartment by pushing the slide fastener in the direction of the arrow with the close-lock symbol.

Insert and remove the battery on the GG02 plus step-by-step

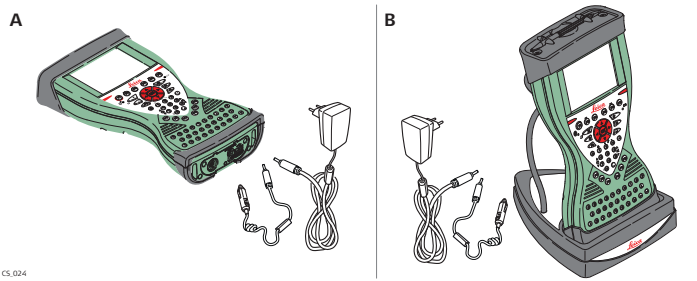


Step	Description
1.	Turn GG02 plus over to gain access to the battery compartment.
2.	Open the battery compartment by pushing the slide fastener in the direction of the arrow with the open-lock symbol.
3.	Pull out the battery housing. The battery is attached to the housing.

Step	Description
4.	Hold the battery housing and pull the battery from the battery housing.
5.	A polarity of the battery is displayed inside the battery housing. This is a visual aid to assist in placing the battery correctly.
6.	Place the battery onto the battery housing, ensuring that the contacts are facing outward. Click the battery into position.
7.	Close the battery compartment by pushing the slide fastener in the direction of the arrow with the close-lock symbol.

3.3.3 Charging the Battery

Charge battery step-by-step



Step	Description
1.	Connect the GEV235 power adapter or GDC221 car adapter with the CS field controller (A) or the docking station (B) and an A/C plug.
2.	The power LED on the CS field controller switches on. When CS field controller's battery is fully charged the LED switches off again. ☞ Refer to "LED indicators" for information about the power LED.

The following advice is only valid for battery charger, power adapter and car adapter.

Warning

If you open the product, either of the following actions may cause you to receive an electric shock.

- Touching live components
- Using the product after incorrect attempts were made to carry out repairs

Precautions:

Do not open the product. Only Leica Geosystems authorised service workshops are entitled to repair these products.

The following advice is only valid for batteries, power adapter or docking station.

Caution

The product is not designed for use under wet and severe conditions. If unit becomes wet it may cause you to receive an electric shock.

Precautions:

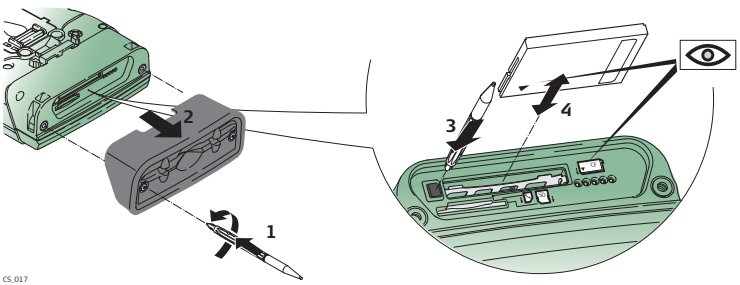
Use the product only in dry environments, for example in buildings or vehicles. Protect the product against humidity. If the product becomes humid, it must not be used!

3.4 Working with the Memory Device

- Keep the card dry.
- Use it only within the specified temperature range.
- Do not bend the card.
- Protect the card from direct impacts.

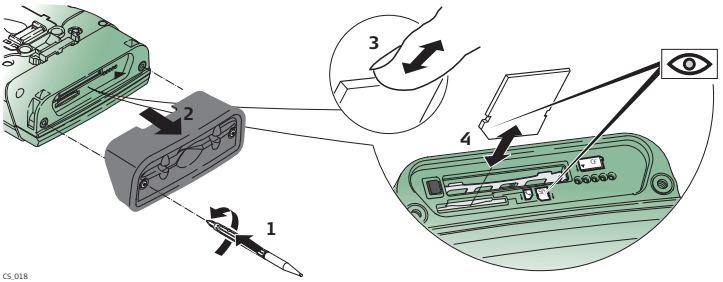
Failure to follow these instructions could result in data loss and/or permanent damage to the card.

Insert and remove a CompactFlash card step-by-step



Step	Description
☞	The CompactFlash card is inserted into a slot inside the top of the CS10/CS15.
1.	Refer to "Fixing the slot cover to the CS step-by-step". Loosen the screws inside the slot cover on top of the CS10/CS15 using the screwdriver end of the stylus.
2.	Detach the slot cover from the CS10/CS15.
3.	Slide the card firmly into the slot until it clicks into position. ☞ Do not force the card into the slot.
4.	The card must be held with the contacts facing the slot.
5.	Attach the slot cover and tighten the screws.
6.	To remove the card, detach the slot cover of the CS10/CS15.
7.	Press the eject button next to the card slot twice.
8.	Remove the CompactFlash card and attach the slot cover.

Insert and remove an SD card step-by-step



Step	Description
☞	The SD card is inserted into a slot inside the top of the CS10/CS15.
1.	Refer to "Fixing the slot cover to the CS step-by-step". Loosen the screws inside the slot cover on top of the CS10/CS15 using the screwdriver end of the stylus.
2.	Detach the slot cover from the CS10/CS15.
3.	Slide the card firmly into the slot until it clicks into position. ☞ Do not force the card into the slot.
4.	The card must be held with the contacts facing the slot.

Step	Description
5.	Attach the slot cover and tighten the screws.
6.	To remove the card, detach the slot cover of the CS10/CS15.
7.	Gently press the top of the card to release it from the slot.
8.	Remove the SD card and attach the slot cover.

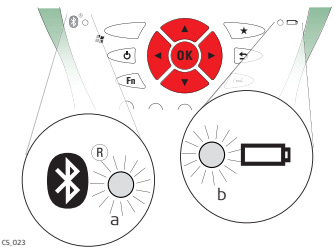
3.5 LED Indicators on CS10/CS15

LED indicators

Description

The CS field controller has **L**ight **E**mitting **D**iode indicators. They indicate the basic field controller status.

Diagram



a) Bluetooth LED
b) Power LED

Description of the LEDs

IF the	is	THEN
Bluetooth LED	green	Bluetooth is in data mode and ready for connecting.
	purple	Bluetooth is connecting.
	blue	Bluetooth has connected.
	flashing blue	data is being transferred
Power LED	off	power is off.
	green	power is okay.
	flashing green	power is okay. The battery is being charged.
	yellow	power is low. The remaining time for which enough power is available depends on the use of wireless modules, the temperature and the age of the battery.
	flashing yellow	power is low. The remaining time for which enough power is available depends on the use of wireless modules, the temperature and the age of the battery. The battery is being charged.
	red	power is very low. The battery should be changed.
	flashing red	power is very low. The battery is being charged.

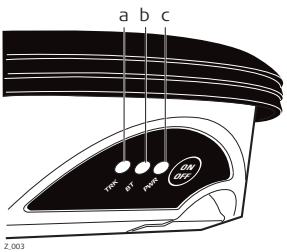
3.6 LED Indicators on GG02 plus

LED indicators

Description

The GG02 plus instrument has **L**ight **E**mitting **D**iode indicators. They indicate the basic instrument status.

Diagram



a) Tracking LED (TRK)
b) BT - Bluetooth LED (BT)
c) Power LED (PWR)

Description of the LEDs

IF the	is	THEN
TRK LED	off	No satellites are tracked.
	flashing green	Less than four satellites are tracked, a position is not yet available.
	green	Enough satellites are tracked to compute a position.
	red	GG02 plus instrument is initialising.
BT LED	green	Bluetooth is in data mode and ready for connecting.
	purple	Bluetooth is connecting.
	blue	Bluetooth has connected.
	flashing blue	Data is being transferred.
PWR LED	off	Power is off.
	green	Power is okay.
	flashing green	Power is low. The remaining time for which enough power is available depends on the type of survey, the temperature and the age of the battery.

3.7 Using the Digital Camera

Overview

Both CS field controllers are equipped with a digital camera located at the underside (refer to "1.4 CS Components"). If a hand strap or pole holder plate is mounted, the camera view is not limited. The camera application can be started from the desktop icon **Camera** or from the Start menu **Start - Programs - Camera**.

Taking a picture step-by-step

Step	Description
1.	Aim the camera to the desired target.
2.	Check the view at the display.
3.	Press **OK** or click **Capture** to take the picture. ☞ **Capture** changes to **Save**.
4.	Press **OK** again or click **Save** to open the **Save As** dialog.
5.	Click **Discard** to reject the picture.

Storing a picture step-by-step

Step	Description
	The **Save As** dialog is Windows CE standard and allows to name the picture, choose the location or to create a folder.
1.	Browse to the desired folder or create a new one.
2.	Name the picture.
3.	Press **OK** to save it and return to the camera view.
4.	Press **Cancel** to reject the picture and to return to the camera view without saving the picture.

4 Care and Transport

4.1 Transport

Transport in a road vehicle	Never carry the product loose in a road vehicle, as it can be affected by shock and vibration. Always carry the product in its transport container and secure it.
Shipping	When transporting the product by rail, air or sea, always use the complete original Leica Geosystems packaging, transport container and cardboard box, or its equivalent, to protect against shock and vibration.
Shipping, transport of batteries	When transporting or shipping batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping, contact your local passenger or freight transport company.

4.2 Storage

Product

Respect the temperature limits when storing the equipment, particularly in summer if the equipment is inside a vehicle. Refer to "6 Technical Data" for information about temperature limits.

Li-Ion batteries

- Refer to "6 Technical Data" for information about storage temperature range.
- At the recommended storage temperature range, batteries containing a 10% to 50% charge can be stored for up to one year. After this storage period the batteries must be recharged.
- Remove batteries from the product and the charger before storing.
- After storage recharge batteries before using.
- Protect batteries from damp and wetness. Wet or damp batteries must be dried before storing or use.
- A storage temperature range of -20°C to +30°C/-4°F to 86°F in a dry environment is recommended to minimise self-discharging of the battery.

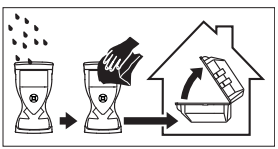
4.3 Cleaning and Drying

Product and accessories

- Use only a clean, soft, lint-free cloth for cleaning. If necessary, moisten the cloth with water or pure alcohol. Do not use other liquids; these may attack the polymer components.

Damp products

Dry the product, the transport container, the foam inserts and the accessories at a temperature not greater than 40°C/104°F and clean them. Do not repack until everything is dry. Always close the transport container when using in the field.



Cables and plugs

Keep plugs clean and dry. Blow away any dirt lodged in the plugs of the connecting cables.

Connectors with dust caps

Wet connectors must be dry before attaching the dust cap.

5 Safety Directions

5.1 General Introduction

Description

The following directions enable the person responsible for the product, and the person who actually uses the equipment, to anticipate and avoid operational hazards.

The person responsible for the product must ensure that all users understand these directions and adhere to them.

5.2 Intended Use

Permitted use

- Remote control of product.
- Data communication with external appliances.

Adverse use

- Use of the product without instruction.
- Use outside of the intended limits.
- Disabling safety systems.
- Removal of hazard notices.
- Opening the product using tools, for example screwdriver, unless this is permitted for certain functions.
- Modification or conversion of the product.
- Use after misappropriation.
- Use of products with recognisable damages or defects.
- Use with accessories from other manufacturers without the prior explicit approval of Leica Geosystems.
- Inadequate safeguards at the working site, for example when measuring on roads.
- Controlling of machines, moving objects or similar monitoring application without additional control- and safety installations.

Warning

Adverse use can lead to injury, malfunction and damage.
It is the task of the person responsible for the equipment to inform the user about hazards and how to counteract them. The product is not to be operated until the user has been instructed on how to work with it.

5.3 Limits of Use

Environment

Suitable for use in an atmosphere appropriate for permanent human habitation: not suitable for use in aggressive or explosive environments.

Danger

Local safety authorities and safety experts must be contacted before working in hazardous areas, or close to electrical installations or similar situations by the person in charge of the product.

The following advice is only valid for battery charger, power adapter and car adapter.

Environment

Suitable for use in dry environments only and not under adverse conditions.

5.4 Responsibilities

Manufacturer of the product

Leica Geosystems AG, CH-9435 Heerbrugg, hereinafter referred to as Leica Geosystems, is responsible for supplying the product, including the user manual and original accessories, in a safe condition.

Manufacturers of non Leica Geosystems accessories

The manufacturers of non Leica Geosystems accessories for the product are responsible for developing, implementing and communicating safety concepts for their products, and are also responsible for the effectiveness of those safety concepts in combination with the Leica Geosystems product.

Person in charge of the product

The person in charge of the product has the following duties:

- To understand the safety instructions on the product and the instructions in the user manual.
- To be familiar with local regulations relating to safety and accident prevention.
- To inform Leica Geosystems immediately if the product and the application becomes unsafe.
- To ensure that the national laws, regulations and conditions for the operation of radio transmitters are respected.

Warning

The person responsible for the product must ensure that it is used in accordance with the instructions. This person is also accountable for the training and the deployment of personnel who use the product and for the safety of the equipment in use.

5.5 Hazards of Use

Warning

The absence of instruction, or the inadequate imparting of instruction, can lead to incorrect or adverse use, and can cause accidents with far-reaching human, material, financial and environmental consequences.

Precautions:

All users must follow the safety directions given by the manufacturer and the directions of the person responsible for the product.

Danger

Because of the risk of electrocution, it is dangerous to use poles and extensions in the vicinity of electrical installations such as power cables or electrical railways.

Precautions:

Keep at a safe distance from electrical installations. If it is essential to work in this environment, first contact the safety authorities responsible for the electrical installations and follow their instructions.

Warning

During dynamic applications, for example stakeout procedures there is a danger of accidents occurring if the user does not pay attention to the environmental conditions around, for example obstacles, excavations or traffic.

Precautions:
The person responsible for the product must make all users fully aware of the existing dangers.

Warning

Inadequate securing of the working site can lead to dangerous situations, for example in traffic, on building sites, and at industrial installations.

Precautions:
Always ensure that the working site is adequately secured. Adhere to the regulations governing safety and accident prevention and road traffic.

Warning

If computers intended for use indoors are used in the field there is a danger of electric shock.

Precautions:
Adhere to the instructions given by the computer manufacturer regarding field use with Leica Geosystems products.

Caution

If the accessories used with the product are not properly secured and the product is subjected to mechanical shock, for example blows or falling, the product may be damaged or people can sustain injury.

Precautions:

When setting-up the product, make sure that the accessories are correctly adapted, fitted, secured, and locked in position.
Avoid subjecting the product to mechanical stress.

Warning

If the product is used with accessories, for example masts, staffs, poles, you may increase the risk of being struck by lightning.

Precautions:

Do not use the product in a thunderstorm.

Warning

Using a battery charger not recommended by Leica Geosystems can destroy the batteries. This can cause fire or explosions.

Precautions:

Only use chargers recommended by Leica Geosystems to charge the batteries.

Caution

During the transport, shipping or disposal of batteries it is possible for inappropriate mechanical influences to constitute a fire hazard.

Precautions:

Before shipping the product or disposing of it, discharge the batteries by running the product until they are flat.

When transporting or shipping batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping contact your local passenger or freight transport company.

Warning

High mechanical stress, high ambient temperatures or immersion into fluids can cause leakage, fire or explosions of the batteries.

Precautions:

Protect the batteries from mechanical influences and high ambient temperatures. Do not drop or immerse batteries into fluids.

Warning

If battery terminals come in contact with jewellery, keys, metallised paper or other metals, short circuited battery terminals can overheat and cause injury or fire, for example by storing or transporting in pockets.

Precautions:

Make sure that the battery terminals do not come into contact with metallic objects.

The following advice is only valid for battery charger, power adapter and car adapter.

Warning

If you open the product, either of the following actions may cause you to receive an electric shock.

- Touching live components
- Using the product after incorrect attempts were made to carry out repairs

Precautions:

Do not open the product. Only Leica Geosystems authorised service workshops are entitled to repair these products.

The following advice is only valid for batteries, power adapter or docking station.

Caution

The product is not designed for use under wet and severe conditions. If unit becomes wet it may cause you to receive an electric shock.

Precautions:

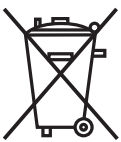
Use the product only in dry environments, for example in buildings or vehicles. Protect the product against humidity. If the product becomes humid, it must not be used!

Warning

If the product is improperly disposed of, the following can happen:

- If polymer parts are burnt, poisonous gases are produced which may impair health.
- If batteries are damaged or are heated strongly, they can explode and cause poisoning, burning, corrosion or environmental contamination.
- By disposing of the product irresponsibly you may enable unauthorised persons to use it in contravention of the regulations, exposing themselves and third parties to the risk of severe injury and rendering the environment liable to contamination.

Precautions:



The product must not be disposed with household waste.
Dispose of the product appropriately in accordance with the national regulations in force in your country.
Always prevent access to the product by unauthorised personnel.

Product-specific treatment and waste management information can be downloaded from the Leica Geosystems home page at http://www.leica-geosystems.com/treatment or received from your Leica Geosystems dealer.

Warning

Only Leica Geosystems authorised service workshops are entitled to repair these products.

5.6 Electromagnetic Compatibility EMC

Description

The term Electromagnetic Compatibility is taken to mean the capability of the product to function smoothly in an environment where electromagnetic radiation and electrostatic discharges are present, and without causing electromagnetic disturbances to other equipment.

Warning

Electromagnetic radiation can cause disturbances in other equipment.

Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment may be disturbed.

The product is a class A product when operated with the internal batteries. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Caution

There is a risk that disturbances may be caused in other equipment if the product is used with accessories from other manufacturers, for example field computers, personal computers, two-way radios, non-standard cables or external batteries.

Precautions:

Use only the equipment and accessories recommended by Leica Geosystems. When combined with the product, they meet the strict requirements stipulated by the guidelines and standards. When using computers and two-way radios, pay attention to the information about electromagnetic compatibility provided by the manufacturer.

Caution

Disturbances caused by electromagnetic radiation can result in erroneous measurements.

Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that the product may be disturbed by intense electromagnetic radiation, for example, near radio transmitters, two-way radios or diesel generators.

Precautions:

Check the plausibility of results obtained under these conditions.

Warning

If the product is operated with connecting cables attached at only one of their two ends, for example external supply cables, interface cables, the permitted level of electromagnetic radiation may be exceeded and the correct functioning of other products may be impaired.

Precautions:
While the product is in use, connecting cables, for example product to external battery, product to computer, must be connected at both ends.

Radios or digital cellular phones

Use of product with radio or digital cellular phone devices:

Warning

Electromagnetic fields can cause disturbances in other equipment, in installations, in medical devices, for example pacemakers or hearing aids and in aircraft. It can also affect humans and animals.

Precautions:
Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment can be disturbed or that humans or animals can be affected.

- Do not operate the product with radio or digital cellular phone devices in the vicinity of filling stations or chemical installations, or in other areas where an explosion hazard exists.
- Do not operate the product with radio or digital cellular phone devices near to medical equipment.
- Do not operate the product with radio or digital cellular phone devices in aircraft.

5.7 FCC Statement, Applicable in U.S.

The greyed paragraph below is only applicable for products without radio.

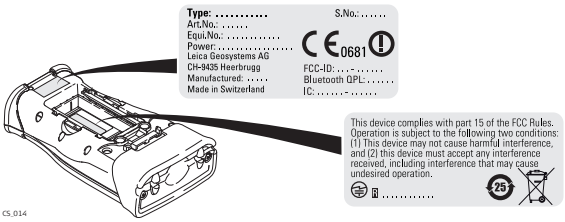
Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules.
These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

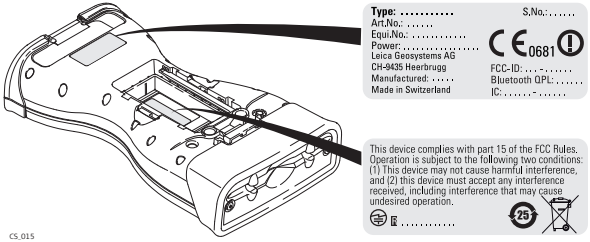
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning Changes or modifications not expressly approved by Leica Geosystems for compliance could void the user's authority to operate the equipment.

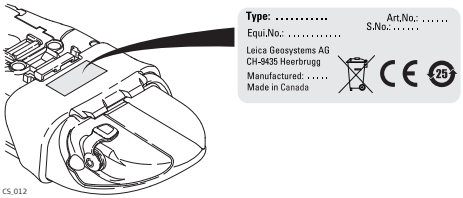
Labelling CS10


Type: .....
S.No.: .....
Art.No.: .....
Equi.No.: .....
Power: .....
Leica Geosystems AG
CH-9435 Heerbrugg
Manufactured: .....
Made in Switzerland
0681
FCC-ID: ... - .....
Bluetooth QPL: .....
IC: ..... - .....
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
CS_014

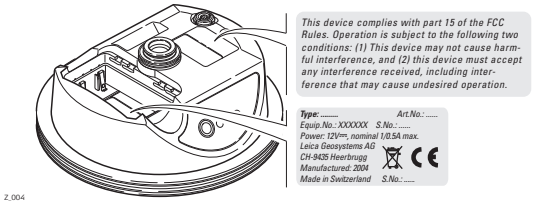
Labelling CS15


Type: .....
S.No.: .....
Art.No.: .....
Equi.No.: .....
Power: .....
Leica Geosystems AG
CH-9435 Heerbrugg
Manufactured: .....
Made in Switzerland
0681
FCC-ID: ... - .....
Bluetooth QPL: .....
IC: ..... - .....
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
CS_015

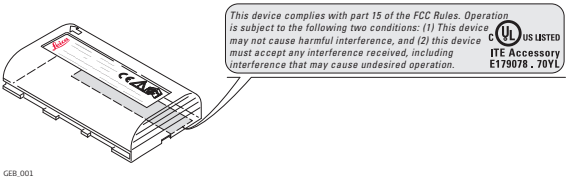
Labelling GS05, GS06



Labelling GG02 plus


This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Type: .....
Art.No.: .....
Equip.No.: XXXXXX
S.No.: .....
Power: 12V⎓, nominal 1/0.5A max.
Leica Geosystems AG
CH-9435 Heerbrugg
Manufactured: 2004
Made in Switzerland
S.No.: .....
CE
Z_004

Labelling internal battery GEB211, GEB212


This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
C US LISTED
ITE Accessory
E179078 . 70YL
GEB_001

Exposure to radio frequency (RF) signals

The wireless device is a radio transmitter and receiver. It is designed and manufactured not to exceed the emission limit for exposure to radio frequency (RF) energy set by the OET Bulletin 65 Supplement C / Ministry of Health (Canada), Safety Code 6. These limits are part of comprehensive guidelines and established permitted levels of RF energy for the general population. These guidelines are based on the safety standards previously set by international standard bodies. These standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health.

This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

This device has been shown to be capable of compliance for localised specific absorption rate (SAR) for uncontrolled environment / general public exposure limits specific in ANSI/IEEE C95.1-1992 and had been tested in accordance with the measurement procedures specified in IEEE Std. 1528-2003.

SAR compliance for body-worn operating configurations is limited to specific belt-clips, holsters or similar accessory configurations that have no metallic component in the assembly providing at least 1.0 cm separation distance between the device and the body of the user.

6 Technical Data

6.1 CS10/CS15 Technical Data

Design

Glass reinforced polymer housing with optional integrated battery.

Control unit

CS10

Display:	VGA (480 x 640 pixels), graphics capable LCD, illumination, touch screen, colour
Keyboard:	26 keys, illumination
Touch screen:	Toughened film on glass
Sound:	Integrated sealed speaker and microphone
Digital camera:	Resolution: 1600 x 1200 pixels, fixed focus lens, image capture: JPEG

CS15

Display:	VGA (640 x 480 pixels), graphics capable LCD, illumination, touch screen, colour
Keyboard:	65 keys including 12 function keys, illumination
Touch screen:	Toughened film on glass

Sound:	Integrated sealed speaker and microphone
Digital camera:	Resolution: 1600 x 1200 pixels, fixed focus lens, image capture: JPEG

Dimensions

Type	Length [m]	Width [m]	Thickness [m]
CS10	0.200	0.102	0.045
CS15	0.245	0.125	0.045

Weight

Type	Weight [kg]/[lbs]
CS10, with battery	0.688/1.517
CS15, with battery	0.838/1.847

Recording

Data can be recorded on the SD card, CompactFlash card, USB stick or in the internal memory.

Power

Type	Consumption [W]	External supply voltage
CS10/CS15	2.0	Nominal voltage 12 V DC (⎓) Voltage range 10.5 V-28 V

Internal battery

Type	Battery	Voltage	Capacity	Operating time, typical*
CS10/CS15	Li-Ion	7.4 V	GEB212: 2.6 Ah	10 h

* Operating time depends on use of wireless communication devices.

Environmental specifications

Temperature

Type	Operating temperature [°C]	Storage temperature [°C]
CS10/CS15	-30 to +60	-40 to +80
Internal battery	-20 to +55	-40 to +70

Protection against water, dust and sand

Type	Protection
CS10/CS15	IP67 (IEC60529) Dust tight Waterproof to 1 m temporary immersion

Humidity

Type	Protection
CS10/CS15	Up to 100 % The effects of condensation are to be effectively counteracted by periodically drying out CS10/CS15.

Interfaces

Type	RS232	USB Host	USB OTG	Bluetooth	WLAN
CS10/CS15	LEMO port or DSUB9	LEMO port or USB A	LEMO port, USB Mini-AB or docking station contacts	Class 2	802.11b/g

Data format for RS232

The default values are:

Baud rate:	115200
Parity:	None
Terminator:	CR/LF
Data bits:	8
Stop bits:	1

Ports

Type	8 pin LEMO-1	DSUB9	USB A Host	USB Mini	Docking station contacts
CS10/CS15	For power and/or communication	For communication			For power and/or communication

6.2 GS05/GS06 Technical Data

6.2.1 Tracking Characteristics

Instrument technology	SmartTrack+	
Satellite reception	Single frequency	
Instrument channels	GS05/GS06:	Up to 14 channels continuous tracking on L1 (GPS); up to 14 channels continuous tracking on L1 (GLONASS); one channel tracking SBAS.
	☞	Depending on the satellite systems and signals configured, a maximum number of 14 channels is allocated.

Supported codes and phases

GPS

Type	L1
GS05/GS06	Carrier phase, C/A-code

GLONASS

Type	L1
GS05/GS06	Carrier phase, C/A-code

☞ Carrier phase and code measurements on L1 (GPS) are fully independent with AS on or off.

Satellites tracked

GS05/GS06: Up to 14 simultaneously on L1 (GPS) + up to 14 simultaneously on L1 (GLONASS) + up to one SBAS

6.2.2 Accuracy

Accuracy is dependent upon various factors including the number of satellites tracked, constellation geometry, observation time, ephemeris accuracy, ionospheric disturbance, multipath and resolved ambiguities.

The following accuracies, given as **r**oot **m**ean **s**quare, are based on measurements processed using LGO and on real-time measurements.

The use of multiple GNSS systems can increase accuracy by up to 30% relative to GPS only.

Differential code	The baseline precision of a differential code solution for static and kinematic surveys is 40 cm.

6.2.3 Technical Data

Description and use

The table gives a description and the intended use of the GS05/GS06.

Type	Description	Use
GS05	L1 GPS, GLONASS SmartTrack+ antenna.	With CS10 field controller.
GS06	L1 GPS, GLONASS SmartTrack+ antenna.	With CS15 field controller.

Dimensions

Type	Length [m]	Width [m]	Thickness [m]
Zeno 10 (GS05 with CS10)	0.278	0.102	0.045
Zeno 15 (GS06 with CS15)	0.323	0.125	0.045

Connector

5 pin interface port

Weight

Type	Weight [kg]/[lbs]
Zeno 10 (GS05 with CS10)	0.750/1.653
Zeno 15 (GS06 with CS15)	0.910/2.006

Power

Power consumption: 0.5 W typically, 45 mA
External supply voltage: Nominal 12 V DC (⎓), voltage range 5 V-28 V DC

Electrical data

Type	GS05/GS06
Voltage	-
Current	-
Frequency	GPS L1 1575.42 MHz GLONASS L1 1602.5625 MHz-1611.5 MHz
Gain	Typically 27 dBi
Noise Figure	Typically < 2 dBi

Environmental specifications

Temperature

Operating temperature [°C]	Storage temperature [°C]
-30 to +60	-40 to +80

Protection against water, dust and sand

Protection
IP67 (IEC 60529)
Dust tight
Protected against water jets
Waterproof to 1 m temporary immersion

Humidity

Protection
Up to 100 %
The effects of condensation are to be effectively counteracted by periodically drying out the antenna.

6.3 GG02 plus Technical Data

6.3.1 Tracking Characteristics

Satellite reception

GG02 plus: Dual frequency.

Instrument channels

GG02 plus: Up to 16 channels continuous tracking on L1, L2 (GPS); up to 14 channels continuous tracking on L1 and L2 (GLONASS); four channels tracking SBAS (EGNOS, WAAS, MSAS, GAGAN).

☞ Depending on the satellite systems and signals configured, a maximum number of 72 channels is allocated.

Supported codes and phases

GPS

Type	L1	L2
GG02 plus	Carrier phase, C/A-code	Carrier phase, C code (L2C) and P2-code

GLONASS

Type	L1	L2
GG02 plus	Carrier phase, C/A-code	Carrier phase, P2-code

Carrier phase and code measurements on L1, L2 and L5 (GPS) are fully independent with AS on or off.

Satellites tracked	GG02 plus:	Up to 16 simultaneously on L1, L2 (GPS) + up to 14 simultaneously on L1 and L2 (GLONASS)+ up to four SBAS (EGNOS, WAAS, MSAS, GAGAN)

6.3.2 Accuracy

Accuracy is dependent upon various factors including the number of satellites tracked, constellation geometry, observation time, ephemeris accuracy, ionospheric disturbance, multipath and resolved ambiguities.

The following accuracies, given as **r**oot **m**ean **s**quare, are based on measurements processed using Zeno Office and on real-time measurements.

The use of multiple GNSS systems can increase accuracy by up to 30% relative to GPS only.

Differential code

The baseline precision of a differential code solution for static and kinematic surveys is 25 cm.

Differential phase in post-processing

Static and rapid static

Static		Kinematic	
Horizontal	**Vertical**	**Horizontal**	**Vertical**
5 mm + 0.5 ppm	10 mm + 0.5 ppm	10 mm + 2 ppm	20 mm + 2 ppm

Static with long observations

Static		Kinematic	
Horizontal	**Vertical**	**Horizontal**	**Vertical**
3 mm + 0.5 ppm	6 mm + 0.5 ppm	10 mm + 2 ppm	20 mm + 2 ppm

Differential phase in real-time

Static		Kinematic	
Horizontal	**Vertical**	**Horizontal**	**Vertical**
5 mm + 0.5 ppm	10 mm + 0.5 ppm	10 mm + 2 ppm	20 mm + 2 ppm

6.3.3 Technical Data

Description and use

The table gives a description and the intended use of the GG02 plus.

Type	Description	Use
GG02 plus	L1, L2 GPS, GLONASS antenna.	With CS10, CS15 or CS25 field controller.

Dimensions

Height: 0.089 m
Diameter: 0.186 m

Connector

- 8 pin LEMO-1

Mounting

5/8" Whitworth

Weight

1.1 kg including internal battery

Power

Power consumption: 1.8 W typically
External supply voltage: Nominal 12 V DC (⎓), voltage range 10.5 V-28 V

Battery internal

Type:	Li-Ion
Voltage:	7.4 V
Capacity:	GEB211: 2.2 Ah GEB212: 2.6 Ah
Typical operating time:	7 h The given operating times are valid for • one fully charged GEB212 battery. • 25°C. Operating times will be shorter when working in cold weather.

Electrical data

Type	GG02 plus
Frequency	
GPS L1 1575.42 MHz	✓
GPS L2 1227.60 MHz	✓
GPS L5 1176.45 MHz	-
GLONASS L1 1602.5625-1611.5 MHz	✓
GLONASS L2 1246.4375-1254.3 MHz	✓
Galileo E1 1575.42 MHz	-
Galileo E5a 1176.45 MHz	-

Type	GG02 plus
Galileo E5b 1207.14 MHz	-
Galileo Alt-BOC 1191.795 MHz	-
Gain	Typically 27 dBi
Noise Figure	Typically < 2 dBi

Environmental specifications

Temperature

Operating temperature [°C]	Storage temperature [°C]
-40 to +65 Bluetooth: -30 to +65	-40 to +80

Protection against water, dust and sand

Protection
IP67 (IEC 60529) Dusttight Protected against water jets Waterproof to 1 m temporary immersion

Humidity

Protection
Up to 100 % The effects of condensation are to be effectively counteracted by periodically drying out the antenna.

6.4 Antennas Technical Data

Description and use

The table gives a description and the intended use of the antenna.

Type	Description	Use
AS05	L1 GPS, GLONASS SmartTrack+ antenna with built-in ground plane.	With CS10/GS05, CS15/GS06.

Dimensions

Type	AS05
Height	6.2 cm
Diameter	17.0 cm

Connector

AS05: TNC female

Mounting

AS05: 5/8" Whitworth

Weight

AS05: 0.4 kg

Electrical data

Type	AS05
Voltage	4.5 V to 18 V DC
Current	35 mA typical
Frequency	GPS L1 1575.42 MHz GLONASS L1 1602.5625 MHz-1611.5 MHz
Gain (typically)	27 dBi
Noise Figure (typically)	< 2 dBi

Environmental specifications

Temperature

Type	Operating temperature [°C]	Storage temperature [°C]
AS05	-40 to +70	-55 to +85

Protection against water, dust and sand

Type	Protection
AS05	IP67 (IEC 60529) Dust tight Protected against water jets Waterproof to 1 m temporary immersion

Humidity

Type	Protection
AS05	Up to 100 % The effects of condensation are to be effectively counteracted by periodically drying out the antenna.

Cable length

Separation distance from instrument ...	to antenna	Supplied cable lengths [m]
GS05/GS06	AS05	1.2

6.5 Conformity to National Regulations

6.5.1 CS10

Conformity to national regulations

- FCC Part 15 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the product CS10 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity can be consulted at http://www.leica-geosystems.com/ce.

Class 2 equipment according European Directive 1999/5/EC (R&TTE) for which following EEA Member States apply restrictions on the placing on the market or on the putting into service or require authorisation for use:

- France
- Italy
- Norway (if used in the geographical area within a radius of 20km from the centre of Ny-Ålesund)

- The conformity for countries with other national regulations not covered by the FCC part 15 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band

Type	Frequency band [MHz]
CS10, Bluetooth	2402 - 2480
CS10, 3.5G GSM/UMTS	UMTS/HSDPA (WCDMA/FDD) 850 / 1900 / 2100 Quad-Band EGSM 850 / 900 / 1800 / 1900 GPRS multi-slot class 12 EDGE multi-slot class 12
CS10, WLAN	2400 - 2484

Output power

Type	Output power [mW]
CS10, Bluetooth	2.5
CS10, 3.5G GSM/UMTS EGSM850/900	2
CS10, 3.5G GSM/UMTS GSM1800/1900	1
CS10, 3.5G GSM/UMTS UMTS2100	0.25
CS10, 3.5G GSM/UMTS EDGE850/900	0.5
CS10, 3.5G GSM/UMTS EDGE1800/1900	0.4
CS10, WLAN (802.11b)	50
CS10, WLAN (802.11g) 6 Mbit/s-36 Mbit/s	50
CS10, WLAN (802.11b) 48 Mbit/s-56 Mbit/s	31.6

Antenna

Type	Antenna	Gain [dBi]	Connector	Frequency band [MHz]
CS10, Bluetooth	Integrated antenna	-	-	-
CS10, 3.5G GSM/UMTS	Integrated antenna	-	-	-
CS10, WLAN	Integrated antenna	-	-	-
GS05	Internal GNSS antenna element (receive only)	-	-	-

6.5.2 CS15

Conformity to national regulations

- FCC Part 15 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the product CS15 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity can be consulted at http://www.leica-geosystems.com/ce.

Class 2 equipment according European Directive 1999/5/EC (R&TTE) for which following EEA Member States apply restrictions on the placing on the market or on the putting into service or require authorisation for use:

- France
- Italy
- Norway (if used in the geographical area within a radius of 20km from the centre of Ny-Ålesund)

- The conformity for countries with other national regulations not covered by the FCC part 15 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band

Type	Frequency band [MHz]
CS15, Bluetooth	2402 - 2480
CS15, 3.5G GSM/UMTS	UMTS/HSDPA (WCDMA/FDD) 850 / 1900 / 2100 Quad-Band EGSM 850 / 900 / 1800 / 1900 GPRS multi-slot class 12 EDGE multi-slot class 12
CS15, WLAN	2400 - 2484

Output power

Type	Output power [mW]
CS15, Bluetooth	2.5
CS15, 3.5G GSM/UMTS EGSM850/900	2
CS15, 3.5G GSM/UMTS GSM1800/1900	1
CS15, 3.5G GSM/UMTS UMTS2100	0.25
CS15, 3.5G GSM/UMTS EDGE850/900	0.5
CS15, 3.5G GSM/UMTS EDGE1800/1900	0.4
CS15, WLAN (802.11b)	50
CS15, WLAN (802.11g) 6 Mbit/s-36 Mbit/s	50
CS15, WLAN (802.11b) 48 Mbit/s-56 Mbit/s	31.6

Antenna

Type	Antenna	Gain [dBi]	Connector	Frequency band [MHz]
CS15, Bluetooth	Integrated antenna	-	-	-
CS15, 3.5G GSM/UMTS	Integrated antenna	-	-	-
CS15, WLAN	Integrated antenna	-	-	-
GS06	Internal GNSS antenna element (receive only)	-	-	-

6.5.3 GG02 plus

Conformity to national regulations

- FCC Part 15, 22 and 24 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the product GG02 plus is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity can be consulted at http://www.leica-geosystems.com/ce.

Class 1 equipment according European Directive 1999/5/EC (R&TTE) can be placed on the market and be put into service without restrictions in any EEA member state.

- The conformity for countries with other national regulations not covered by the FCC part 15, 22 and 24 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band

Type	Frequency band [MHz]
GG02 plus	1227.60 1575.42 1246.4375 - 1254.3 1602.4375 - 1611.5
Bluetooth	2402 - 2480

Output power

Type	Output power [mW]
GNSS	Receive only
Bluetooth	5 (Class 1)

Antenna

GNSS Bluetooth	Internal GNSS antenna element (receive only) Type: Internal Microstrip antenna Gain: 1.5 dBi

7 International Limited Warranty, Software Licence Agreement

International Limited Warranty

This product is subject to the terms and conditions set out in the International Limited Warranty which you can download from the Leica Geosystems home page at http://www.leica-geosystems.com/internationalwarranty or collect from your Leica Geosystems distributor. The foregoing warranty is exclusive and is in lieu of all other warranties, terms or conditions, expressed or implied, either in fact or by operation of law, statutory or otherwise, including warranties, terms or conditions of merchantability, fitness for a particular purpose, satisfactory quality and non-infringement, all which are expressly disclaimed.

Software Licence Agreement

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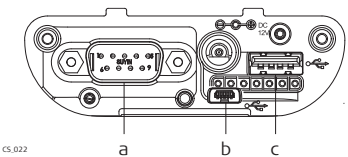
Appendix A Pin Assignments and Sockets

A.1 CS10/CS15

Description

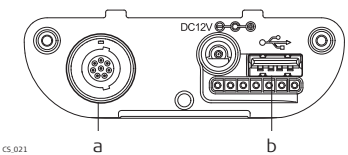
Some applications require knowledge of the pin assignments for the CS10/CS15 ports. In this chapter, the pin assignments and sockets for the ports of the CS10/CS15 are explained.

Ports at the instrument bottom panel - DSUB9 connector



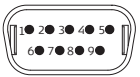
a) DSUB9 port
b) USB Mini port
c) USB A Host port

Ports at the instrument bottom panel - Lemo connector



a) Lemo port (USB and serial)
b) USB A Host port

Pin assignments for RS232 serial port



Pin	Signal Name	Function	Direction
1	NC	Not connected	-
2	RxD	RS232, receive data	In
3	TxD	RS232, transmit data	Out
4	NC	Not connected	-
5	GND	Signal Ground	-
6	NC	Not connected	-
7	RTS	RS232, request to send	Out
8	CTS	RS232, clear to send	In
9	NC	Not connected	-

Pin assignments for 8 pin LEMO-1

Pin	Signal Name	Function	Direction
1	USB_D+	USB data line	In or out
2	USB_D-	USB data line	In or out
3	GND	Signal ground	-
4	RxD	RS232, receive data	In
5	TxD	RS232, transmit data	Out
6	ID	Identification pin	In or out
7	PWR	Power input, 10.5 V-28 V	In
8	TRM_ON/USB_ID	RS232, general purpose signal	In or out

Sockets

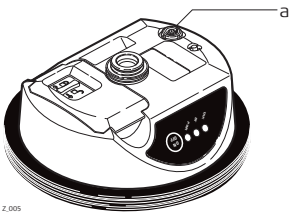
9 pin RS232:	RS232, 9 pin, DE9
8 pin LEMO-1:	LEMO-1, 8 pin, LEMO EGI.1B.308.CLN

A.2 GG02 plus

Description

Some applications require knowledge of the pin assignments for the GG02 plus port. In this chapter, the pin assignments and sockets for the port of the GG02 plus are explained.

Port at the instrument underside



a) Lemo port (USB and serial)

Pin assignments for 8 pin LEMO-1

Pin	Signal Name	Function	Direction
1	USB_D+	USB data line	In or out
2	USB_D-	USB data line	In or out
3	GND	Signal ground	-
4	RxD	RS232, receive data	In
5	TxD	RS232, transmit data	Out
6	ID	Identification pin	In or out
7	PWR	Power input, 10.5 V-28 V	In
8	TRM_ON/USB_ID	RS232, general purpose signal	In or out

Sockets

8 pin LEMO-1:	LEMO-1, 8 pin, LEMO EGI.1B.308.CLN

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